Docket No.: 03-09 US

IN THE SPECIFICATION

1. Please substitute paragraph 4 (lines 23-25) on Page 4 as follows:

"Fig. 1C is a perspective view of a preferred embodiment wherein conducting tube 37 is fixed to wand 10. In this embodiment the position of conductive collar 13 is first adjusted to the required position and then conductive tube 37 is slipped over wand 10 and secured by **machine** screws 36 threaded into insulating plug body 25 of electrical plug 20."

2. Please substitute first paragraph (lines 1-6) on Page 5 as follows:

" dimensions as a capacitor so it fits within the same space and can be held by clips 60; to provide a low resistance connection between the two clips. Specific circuit configurations of the wand are shown in figures ~~6 through 9~~ **6A through 9B**. The spring clip mountings permit the wand configuration to be easily changed. Alternatively surface mount capacitors may be used and soldered directly to the printed circuit eliminating the need for spring clips 60. Similarly electrical jumpers may also be soldered directly to the printed circuit, or the connection may be left open."

3. Please substitute paragraph 2 (lines 7-16) on Page 5 as follows:

"Fig. 3 is preferred embodiment wherein conducting tube 37 is fixed to electrical socket 38, which is mounted in the probe. Electrical socket 38 comprises connector receptacles 41, 42 and 43 (labeled 1, 2, and 3) keyed to receive respective pins 21, 22 and 23 of electrical plug 20. Connector receptacles 41, 42, and 43 are held in place by insulating material 39 of electrical socket 38. Conducting tube 37 is fixed to electrical socket 38 by machine screws 36 that screw into tapped holes in insulating material 39. Conducting tube 37 is a metal tube made of copper or some other metal of high electrical conductivity. Electrical connection is made between conducting tube 37 and connector receptacle 43 (See Fig. 5). When adjustable wand 10 is inserted into conducting tube 37 **as shown in Fig. 4**, spring 15 establishes a low conductivity electrical connection tube 37 and collar 13 and in cooperation with conducting rod11 form a ¼ wave shorted stub."

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4. Please substitute last paragraph (lines 22-34) on Page 5 as follows:

"Fig. 5 a schematic diagram of the probe incorporating conducting tube 37 with electrical socket 38 that receives the wand plug and the remaining electrical circuit of the probe. The NMR sample is contained in within **NMR** probe coil 45 that is located in the magnet in the region containing the most homogeneous magnetic field B_0. The outer shell of conducting tube 37 and connector receptacle 43 are connected to probe ground 50. (If the conducting tube 37 is mounted on the wand its electrical ground is established through pin 23 which plugs into connector receptacle 43 and thereby to probe ground 50). One terminal of circuit variable capacitor **Cs** 47 and one terminal of wave variable capacitor **Ct** 46 are connected to probe ground 50. Input and out signals from and to the console (not shown), are made via a coaxial cable connected to probe cable connector 49. Shield connection 51 of probe cable connector 49 goes to probe ground 50, and the electrically active center wire 52 connects to one side of match variable capacitor **Cm** 48. The other terminal of match variable capacitor **Cm** 48 connects to the ungrounded terminal of circuit tune capacitor **Cs** 47, to connector receptacle 42 and to the probe"

5. Please substitute 1st full paragraph through the last paragraph (lines 3-34) on Page 6 as follows:

"The connection arrangement contained in the wand determines whether single frequency or double frequency operation is selected and the values of capacitors contained in the wand determines which nuclei will be detected by the probe. The following figures illustrate how single and double frequency operation is determined and the capacitors that determine the operating frequencies. Figures ~~6 and 7~~ **6A-B and 7A-B** show the connection arrangement for single frequency operation and Figures ~~8 and 9~~ **8A-B and 9A-B** for double frequency operation.

Single frequency operation of Fig. 6A is achieved by placing electrical jumpers 131 and 133 in place of capacitor 31 and 33 of Fig. 4. **Connections to the probe are made through pins 21, 22, 23 (labeled 1, 2, 3 respectively).** The circuit is left open in place capacitor 32 of Fig. 4. This combination of connections within the wand when inserted into the probe yields a first circuit configuration for single frequency operation.

Fig. 6B is the electrical circuit resulting from the connections selected in Fig. 6A. In this selection the ¼ wave shorted stub is not in the circuit, and is in fact shorted out by jumper 133 of Fig. 6A. If desired a non-conducting rod 111 could replace conducting rod 11 as it does not enter the circuit. Collar 13 with spring contact 15 may also be eliminated. Conducting tube 37 may also be eliminated in the embodiment where tube 37 is normally attached to plug insulator 25 of wand 10. **NMR probe coil 45 is tuned by capacitor Cs 47 and matched by capacitor Cm 48. Connection to the console (not shown) are made through coaxial cable connector 49. Shield connection of connector 49 is attached to probe ground 50.**

Fig. 7A is an alternative wand configuration for single frequency operation. **It is identical to the wand of Fig. 6A with the change that capacitor 32 is fixed therein** . Capacitor 32 is introduced in place of the empty clip of Fig. 6A. This has the property of lowering the resonant frequency of the probe. For example, at a field strength of 9.4 T (400 MHz proton field), the circuit of Fig. 6B might be tuned for phosphorus 31 at 162 MHz. Carbon 13 at 100.6 MHz could be observed with the same probe using the wand of Fig. 7A by proper choice of capacitor 32. **In this configuration the ¼ wave shorted stub is not in the circuit being shorted out by electrical jumper 133. Electrical jumper 131 in series with jumper 133 shorts out capacitor Ct 46 of Fig. 5. Plug pins 21,22,23 (labeled 1,2, and 3 respectively) furnish electrical connection means to the probe.** The equivalent circuit Fig. 7B shows capacitor ~~31~~ 32 is in parallel with circuit variable capacitor Cs 47. **The other components of Fig. 7B are identical with those of Fig. 6B, with NMR probe coil 45, matching capacitor Cm 48, connector 49 and ground 50.**

Fig. 8A is a wand configuration for a double tuned circuit. Here the jumper 133 of Fig. 7A is removed thereby unshorting the ¼ wave structure **Capacitors 31 and 33 optimize the coupling of the ¼ wave structure to the probe circuit. Pins 21, 22, 23 (labeled 1, 2, 3 respectively) provide coupling between the wand and the probe circuit.**. Fig. 8B is the equivalent circuit for the combination of wand configuration of Fig. 8A and the probe circuit (Fig. 4). In this configuration length of the ¼ wave shorted stub is adjusted by moving shorting stub12 (Fig 1A). This is done by loosening set screw 17 and moving collar up or down on rod 11 to the desired position and then tightening set screw 17 **(Fig.1A, 4)**. Further adjustment is

achieved by wave variable capacitor Ct 46. **Conducting rod 11, shorting stub 12 and conducting tube 37 comprize a ¼ wave structure. Capacitors 31 and 33 optimize the coupling of the ¼ wave structure to the probe circuit. Probe circuit further comprizes NMR probe coil 45, wave variable capacitor Ct 46, circuit variable capacitor Cs 47 and match variable capacitor Cm 48. Connection to the console (not shown) is made through coaxial cable connector 49. Probe ground connections 50 are made connector 49, conducting tube 37, and capacitors 33, Ct 46, and Cs 47.**

Fig. 9A is an alternative wand configuration for a double tuned circuit. Capacitor 32 is introduced in place of the empty clip of Fig. 8A **The other components of Fig. 9A and their labeling is unchanged from Fig. 8A. The additional capacitor 32** ~~**This**~~ has the property of lowering the resonant "

6. Please substitute on Page 7, first paragraph (lines 1-2) as follows:

" frequencies of the probe. The equivalent circuit Fig. 9B shows capacitor ~~31~~ 32 is in parallel **NMR** probe coil 45. **The other components of Fig. 9B and their labelings are unchanged from Fig.8B** ."